

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES  
SAFETY EVALUATION OF DEVICE

NO.: NR-0399-D-101-E DATE: August 19, 2004

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DEVICE TYPE: Ion Mobility Spectrometer

MODELS: Itemiser II  
Vapor Tracer 2  
-----  
VTEX  
Itemiser 3  
Entryscan 3

DISTRIBUTOR: GE Ion Track  
(Formerly Ion Track Instruments, Inc.)  
205 Lowell Street  
Wilmington, MA 01887

MANUFACTURERS: GE Ion Track                      Cirtronics Corp.  
205 Lowell Street                      528 Route 13 South  
Wilmington, MA 01887                      Milford, NH 03055  
  
Sparton Electronics  
30167 Power Line Road  
Brooksville, FL 34602

SEALED SOURCE MODEL DESIGNATION: Isotope Products Laboratories  
Model NER-004

ISOTOPE:                      MAXIMUM ACTIVITY:  
Nickel-63                      10 millicuries (370 MBq)

LEAK TEST FREQUENCY: Not Required

PRINCIPAL USE: (N) Ion Generators, Chromatography

CUSTOM DEVICE: \_\_\_\_\_ YES \_\_\_\_\_ X \_\_\_\_\_ NO

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DEVICE TYPE: Ion Mobility Spectrometer

DESCRIPTION:

~~The Ion Trap Mobility Spectrometer is designed for the detection~~  
of explosives and narcotic substances. The primary uses are for  
access control and checkpoint security in airports and border  
crossings.

Air containing microscopic particles of various chemical  
substances is drawn into a sample collector. The sample is  
heated in order to vaporize the particulate matter. The vapor is  
drawn into the detector, heated to a maximum of 200°C (392°F),  
ionized by the Nickel-63 source, and passed into a drift region.  
The ionized particles in the vapor are accelerated at different  
rates and arrive at the collector electrode at different times.  
The amount of time the particles take to reach the collector  
electrode can be directly related to the ionized chemical  
substances present in the vapor. Therefore, specific substances  
can be detected according to the time required to reach the  
collector.

The Ni-63 source is encapsulated in a 304 stainless steel cup  
with 1 mm (0.039 in) wall thickness. The source cup is fitted  
into a source enclosure. The completed source assembly is placed  
into a detector cell having a 10 mm (0.39 in) wall thickness, and  
consisting of two ceramic longitudinal halves. The two halves  
are bonded together with cement. The source assembly is  
constrained vertically by a gold-plated ball plunger. The source  
cup is common to all of the devices; only the shape, size, and  
material of the detector housing varies.

The Itemiser II and Entryscan 3 share identical detector cells  
and housings. The detector housing consists of a rectangular box  
having dimensions 7.09 x 2.87 x 2.64 in. (180 x 73 x 67 mm), and  
fabricated of 0.062 in. (1.6 mm) thick 5052-H32 aluminum. Tamper  
resistant screws are used to prevent user access to the detector.  
See Attachments 1 and 4.

The Vapor Tracer 2, VTEX, and Itemiser 3 instruments share  
identical detector cells and housings. The detector housing  
consists of a molded cylindrical sleeve having dimensions 5.3 x  
2.6 x 3.2 in. (135 x 66 x 81 mm), and fabricated of 0.125 in.  
(3.2 mm) thick NOVALAC epoxy. Tamper resistant screws are used  
to prevent user access to the detector. The VTEX and

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DEVICE TYPE: Ion Mobility Spectrometer

DESCRIPTION (cont'd):

Vapor Tracer 2 devices differ only in internal computer parts and peripheral components; VTEX is solely an explosives detector, while Vapor Tracer 2 is both an explosives and narcotics detector. See Attachments 2 and 3.

The Itemiser II, Itemiser 3, and Entryscan 3 products are indoor-use-only devices. The Entryscan 3 is a stand-alone "walkthrough" unit and is a permanent indoor installation at customer sites. The Vapor Tracer 2 and VTEX products are indoor and outdoor use devices.

The devices have the following dimensions:

Model no.	Length	Width	Height
Itemiser II	21.75 in (552.45 mm)	17.5 in (444.5 mm)	13.75 in (349.25 mm)
Vapor Tracer 2 and VTEX	16.5 in (419.1 mm)	4.8 in (121.9 mm)	8.2 in (208.3 mm)
Itemiser 3 (Dimensions with screen in vertical position)	19.76 in (502 mm)	18.88 in (480 mm)	14.94 in (380 mm)
Entryscan 3	56.00 in (1422.40 mm)	64.00 in (1625.60 mm)	102.00 in (2590.80 mm)

Each device contains two labels. One on the outside of the instrument and one on the detector housing on the inside of the instrument. These labels meet the requirements of 10 CFR 32.29. All labels are made of polyester and are self adhesive. See Attachment 5.

Two separate facilities contracted by GE Ion Track will be installing the completed detector (head) assemblies into the devices: Sparton Electronics in Brooksville, FL, and Cirtronics Corp. in Milford, NH. Distribution of the devices is authorized only from the GE Ion Track facility in Wilmington, MA.

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DESCRIPTION (cont'd):

-----Due to the shielding of the beta-radiation components of the -----  
detector cell with ceramic, the aluminum housings in the Itemiser  
II and Entryscan 3 units, and NOVALAC epoxy in the Vapor Tracer  
2, VTEX, and Itemsier 3 units, the manufacturer reports that  
there will be no possibility of contamination on any accessible  
surface of the detector housing or the external surface of the  
devices.

DIAGRAM:

See Attachments 1 through 5.

REFERENCES:

The following supporting documents for the Ion Mobility -  
Spectrometer devices are hereby incorporated by reference and are  
made a part of this registry document.

- Application dated December 15, 2003, and letters dated June  
14, 2004, July 2, 2004, and July 9, 2004, with enclosures  
thereto.

ISSUING AGENCY:

U.S. Nuclear Regulatory Commission

Date: August 19, 2004

Reviewer:

Xiaosong Yin  
Xiaosong Yin

Date: August 19, 2004

Concurrence:

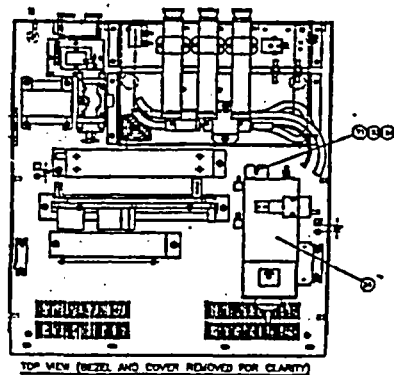
John P. Jankovich  
John P. Jankovich

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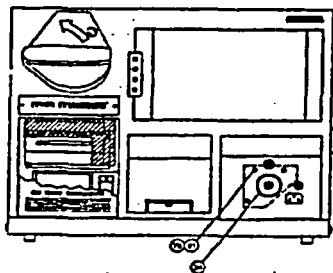
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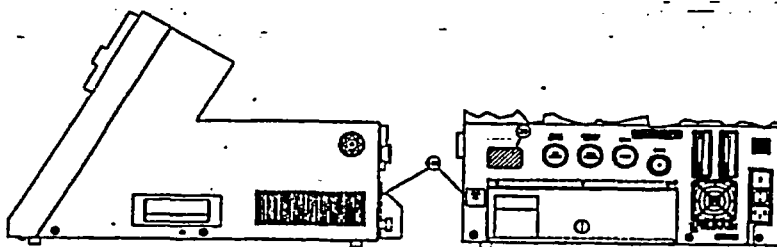
ATTACHMENT 1



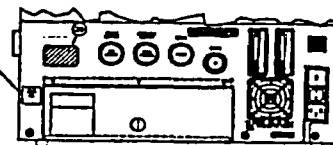
No.	DESCRIPTION
30	SERIAL LABEL
34	DETECTOR
71	WASHER
78	TAMPERPROOF SCREW
81	WASHER
123	TAMPERPROOF SCREW
124	WASHER
182	TREFOIL LABEL



Front view



Side view



Back view

Itemiser II

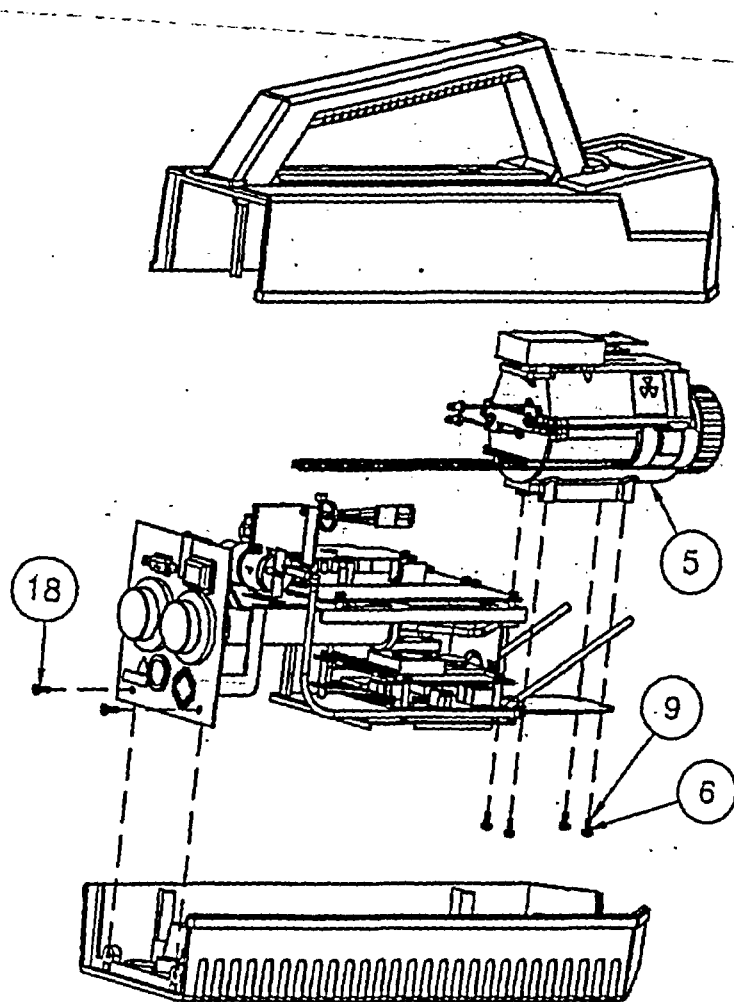
21.75 x 17.5 x 13.75 in (552.45 x 444.5 mm x 349.25 mm)

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ATTACHMENT 2



#	DESCRIPTION
5	DETECTOR
6	WASHER
9	TAMPERPROOF SCREW
18	TAMPERPROOF SCREW

Exploded view

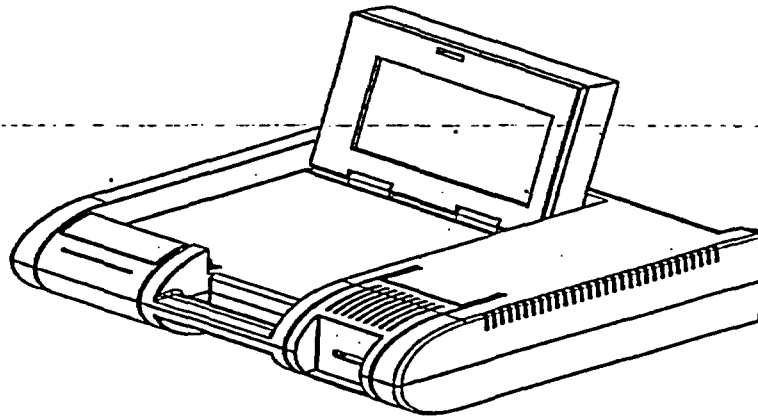
Vapor Tracer 2, and VTEX  
16.5 x 4.8 x 8.2 in (419.1 x 121.9 x 208.3 mm)

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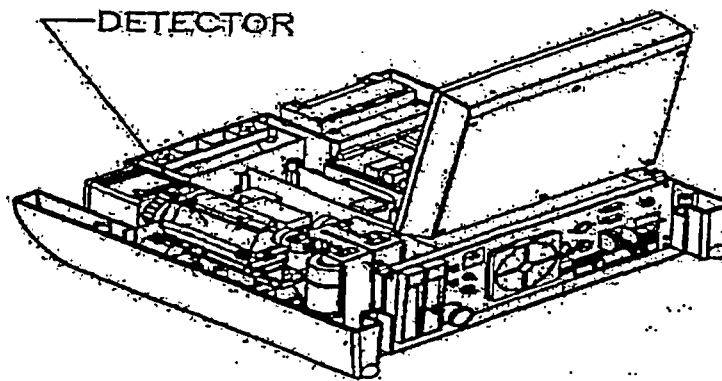
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ATTACHMENT 3



Assembled view



Internal View

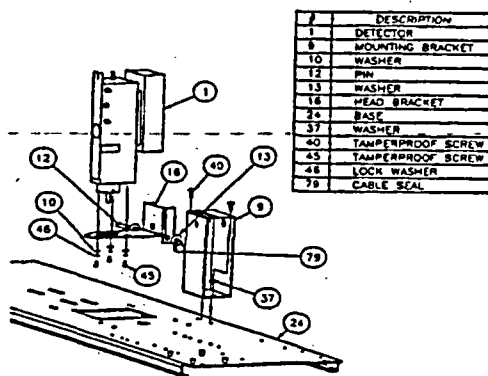
Itemiser 3  
19.76 x 18.88 x 14.94 in (502 x 480 x 380 mm)

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ATTACHMENT 4



Detector assembly with tamper resistant features



Detector

Device with front cover removed

Entryscan 3

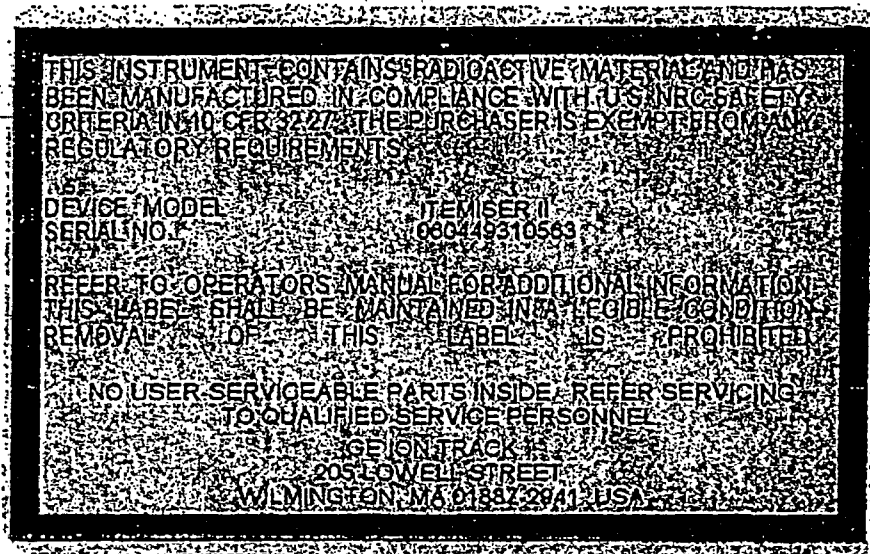
56.00 x 64.00 x 102.00 in (1422.4 x 1625.6 x 2590.8 mm)

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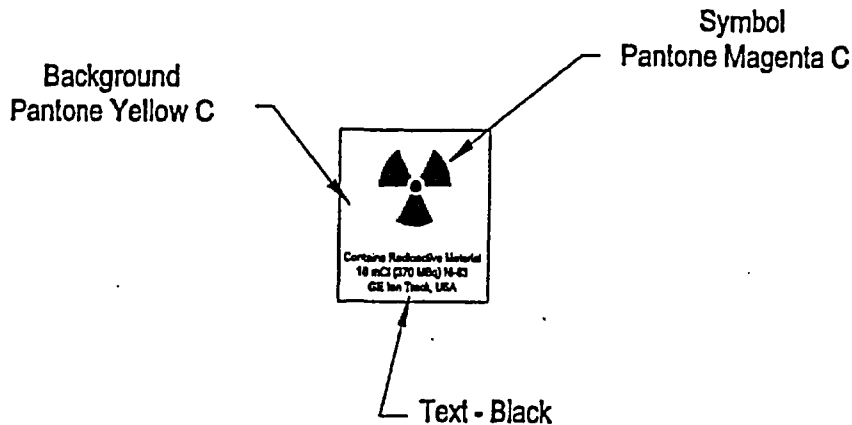
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ATTACHMENT 5



Label on outside of instrument



Label on detector housing